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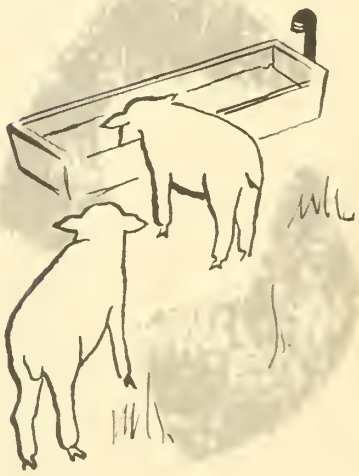
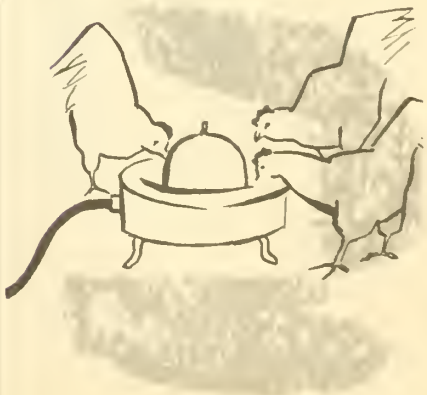
Electric
WATER PUMPS
on the Farm



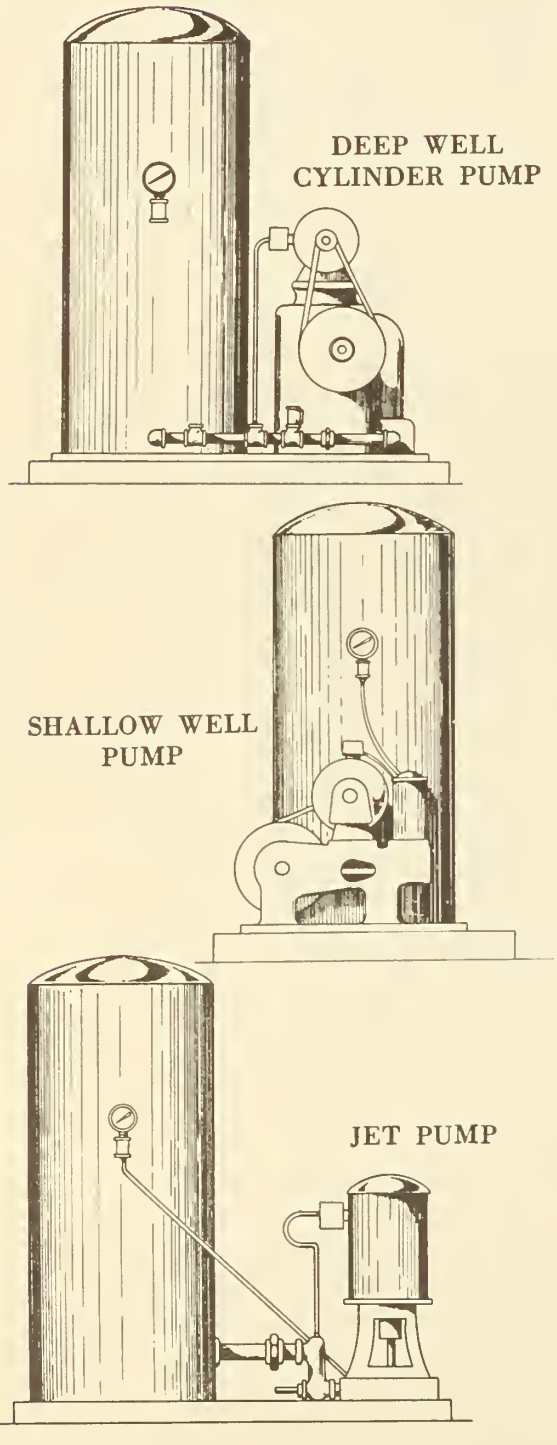


Leaflet No. 436

U. S. DEPARTMENT OF AGRICULTURE

Electric WATER PUMPS *on the Farm*

By L. B. Altman, *Agricultural Engineering Research Division, Agricultural Research Service*



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Piped running water is a convenience enjoyed by too few American farm families.

In 1954 only 58.8 percent of the farms in the United States had piped running water. Only 43 percent had such installations in 1950.

The cost of operating an electric water system is trivial. At a cost of 1 cent an electric pump will deliver more water than a man can pump by hand in an hour. Probably more time and energy are wasted on the hand pumping of water than on any other farm chore.

Advantages

Saves steps.—Farm studies show that piped running water is a real labor saver on the farm. Running water piped to a hog house is saving one farmer 350 steps a day. Another farmer installed 400 feet of pipe terminating at automatic waterers in his poultry house. Previously this watering chore required him to carry 22 tons of water and to walk 39 miles each year.

It took one homemaker 49 minutes to carry the water for a single washing. She walked 1,485 feet and lifted 528 pounds of water. In addition, she carried 11 buckets of water to and from the washer and rinse tubs. With a water system she could have done this work for less than 1 cent's worth of electricity.

Increases production.—An adequate water supply often brings an increase in farm production. Livestock and poultry, especially, require a constant supply for top performance. A pressure water system makes it possible to use automatic equipment to maintain such a supply.

Dry periods often limit the production of gardens. A farm water system provides an economical way to irrigate.

Improves health.—An abundant and readily available supply of water enables farm families to do a more thorough job of washing food, dishes, and clothes. A pressure water system provides a more sanitary means for handling and distributing water, and aids in disposing of waste materials. This improved sanitation has a favorable effect on the health, comfort, and well-being of the family.

Better fire protection.—A pressure water system, strategically located hydrants, and hoses are invaluable aids in extinguishing small fires and in preventing the spread of larger ones. It is advisable to wire in the electric pump ahead of

the main disconnect switch so that power is available to the pump if the main switch has to be pulled in an emergency.

Planning the System

Before a water system can be planned successfully, you must have an adequate supply of safe water. Consult local health authorities or your county agent for help on such problems as where to drill new wells, determining the rate of flow, protecting wells from surface drainage, and how to determine water purity.

If you live in an area where it is difficult to obtain a good supply of well water, you may have to resort to using a farm pond. Pond water should be filtered and chlorinated before it is used for household purposes.

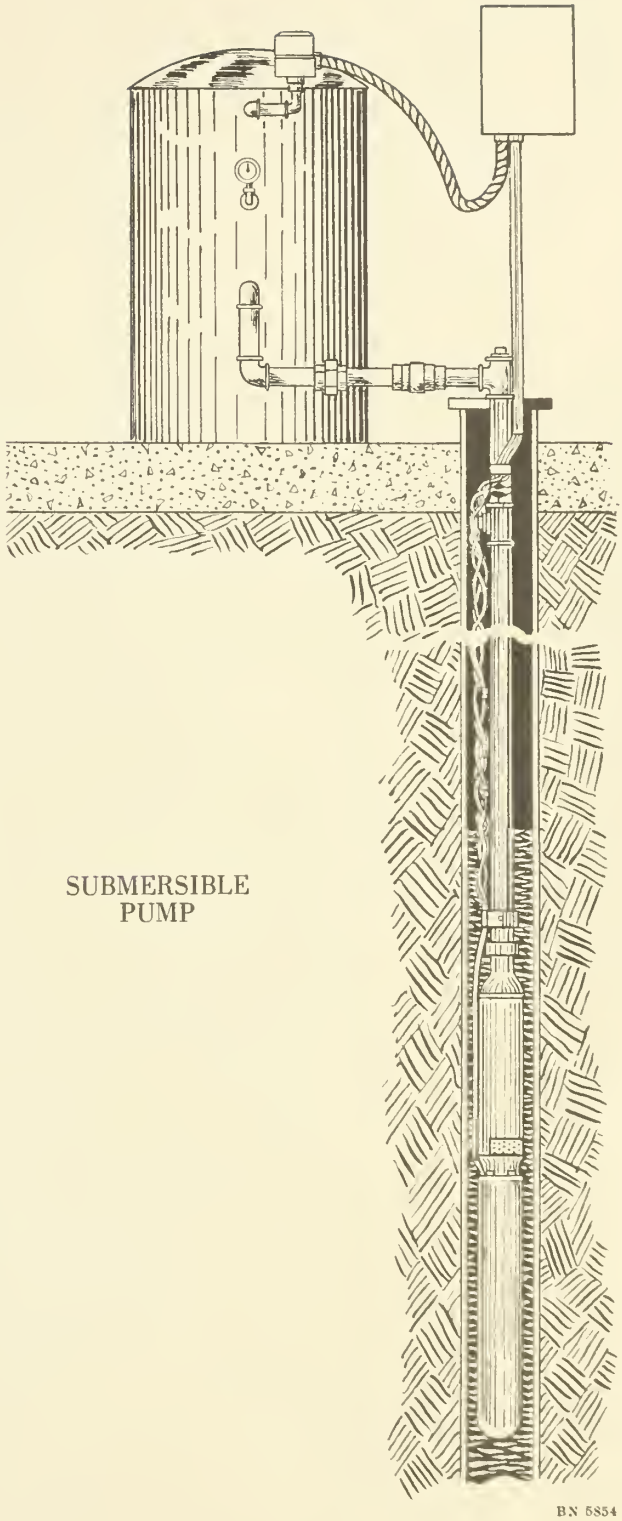
Installing electric pumps, piping, and plumbing fixtures requires skilled labor. Much of the planning, however, must be done by the farmer and his family. Since a complete farm water system may cost more than some families wish to spend at one time, it may be advisable to install only a basic system first. Later, more piping and water-using appliances can be added.

The pump.—The type and depth of the well determines the type of pump to use. If the water in the well is always less than 22 feet below the pump, including draw-down during pumping, plan to use a shallow-well jet or shallow-well piston pump. If this level is more than 22 feet but less than 90 feet, use a deep-well jet or deep-well piston pump. If the water level is more than 90 feet deep, use a deep-well piston or a submersible pump. Follow manufacturers' recommendations on depth limits when they vary from the limits given above. Do not use jet or submersible pumps if the water contains sand.

The pressure tank.—A pressure tank should be used with the pump. Such a tank allows you to draw small quantities of water without causing the pump to start. It also helps to even out the flow of water. The most common size is 42 gallons. This size permits you to use about 8 gallons of water between the stopping and starting of the pump. A pressure switch attached to the tank provides automatic control of the motor and pump.

Pump capacity.—The capacity of the pump should not be greater than the capacity of the well to supply water. If the water flow is strong enough, choose a pump that will deliver at least 300 gallons of water per hour. This capacity enables you to use a ¾-inch hose for fighting fires and for watering gardens. A 600-gallon-per-hour pump with special hose and nozzle is recommended by some fire-protection agencies for effective fighting of small fires or for protecting adjacent buildings during a larger fire.

Aside from fire protection needs, the amount of water required on your farm should determine



SUBMERSIBLE PUMP

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pump capacity. The following table lists the daily requirements for water from a pressure water system.

Use:	Amount (gallons per day)
Each adult	50–100
Each child under 2 years	100
Each milk cow	35
Each horse, dry cow, or beef animal	12
100 chickens	7–10
Each hog	4
Each sheep	2

Generally, you will want your pump to deliver most of this water in a few short periods during the day. Therefore, select a pump size that will furnish the entire daily water needs in 2 hours or less of actual pumping time. If the well capacity does not meet the daily requirements in 2 hours of pumping, use a reservoir or a large pressure tank. The capacity of the reservoir or tank plus the amount of water delivered by 2 hours of pumping should equal at least the daily water requirements.

The distribution system.—A basic distribution system should include pipelines to the house, yard hydrants, milkhouse, and stock-watering equipment. Pipelines to a bathroom and to step-saving appliances may be added later. Consult plumbing tables to be sure that the basic piping is large enough to deliver water at the maximum expected rate throughout the completed water distribution system. Tees and other fittings should be placed in the line to facilitate future expansion of the system.

Water-using appliances.—Once the basic water system is installed, many modern labor-saving appliances may be added as the family budget permits. A water heater, automatic washing machine, dishwasher, or garbage-disposal unit may provide added convenience for the homemaker. Additions of automatic stock and poultry waterers, water heaters, hydrants, hoses, and sprinklers may aid farm production by reducing labor and improving economy of operation.

Cost

The facilities and equipment represent the chief cost of a farm water system. If a suitable well is available, the cost of the pump, pressure tank, and initial piping may be as low as $250.

Operating costs are minor. For example, one farm study showed that 49 cents worth of electric energy pumped and distributed 15,506 gallons of water during 1 month. Pumping costs on 7 Iowa farms, 5 with shallow wells and 2 with deep wells, averaged 4.4 cents per 1,000 gallons at an electric rate of 2 cents per kilowatt-hour.

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More detailed information on sources and quality of water, all types of water pumps including electric, and water storage is available in Farmers' Bulletin 1978, Safe Water for the Farm.

Washington, D. C. **Issued June 1958**

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 5 cents

U. S. GOVERNMENT PRINTING OFFICE: 1957 O—462619